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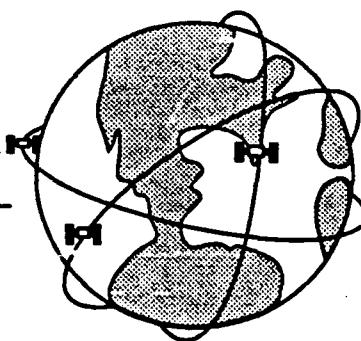
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SCIENTIFIC and TECHNICAL REPORTS SUMMARY
ANNUAL and FINAL REPORTS

CDRL A005

31 MAY 1991

DCDS



Under Contract
DASG60-90-C-0092

Prepared For:

The U.S. Army Strategic Defense Command
P. O. Box 1500
Huntsville, Alabama 35807-3801

Prepared By:

TRW System Development Division
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Huntsville Operations
213 Wynn Drive
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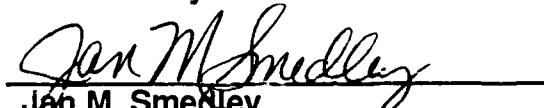
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Reviewed By:


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**Subject: Contract No. DASG60-90-C-0092
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Status Report**

In accordance with the requirements of the subject CDRL, six copies of the Annual Status Report are herewith submitted. Two copies are provided for Jackie Cristina, CSSD-SA-BT. One copy is submitted for CSSD-IM-PA. One copy is submitted for Dynamics Research Corporation. Two copies are submitted for Defense Technical Information Center.

**TRW Inc.
Systems Integration Group**

V.O'L.Bain
**V. O'L. Bain
Contracts Administrator
System Engineering & Development Division**

cc: DPRO/TRW-ACO (1)

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DCDS SCIENTIFIC and TECHNICAL REPORTS SUMMARY

1.0 Objectives

The overall objective of the Distributed Computing Design System (DCDS) program is to ensure that the DCDS environment is usable by contractors and Government programs developing large systems. This effort will accomplish the objectives by providing sustainment to the environment, active technical user support and training for the users of DCDS over a 24-month period.

2.0 Technical Problems

The current DCDS environment consists of an integrated set of tools, languages, and methodologies developed by TRW Inc. under the Software Development Structure (SDS) contract initiated in 1985. The purpose of the current contract is to continue support of this environment.

As the DCDS user base expands, the need for additional support is highlighted. In addition advancements in technology bring the need to keep up. For example, DCDS is currently hosted on a Sun 3 workstation. With the introduction of the Sparc (Sun 4) workstations, the Sun 3 has become a thing of the past. In order for DCDS to continue to succeed efforts must be made to keep DCDS up with the times.

3.0 General Methodology

The DCDS support team at TRW works to support the environment as required by the DCDS user community and directed by the SDC Contracting Officer Representative, Jackie Cristina. In general this level-of-effort contract support methodology is flexible in order to meet the needs of the user community as priorities and needs evolve. During the past year the focus of the programs has been technical assistance, followed by training. Very little effort could be devoted to sustainment due to the effort required to support the ever-growing DCDS user population.

4.0 Technical Results

The accomplishments of this contract can be marked by the ever-increasing acceptance of DCDS as a Software Engineering Environment, as indicated by the statements highlighted below:

- DCDS has been installed in over 150 installation sites. During the past fiscal year alone 33 new copies of DCDS were distributed for installation, consisting of 18 Vax and 15 Sun 3 releases.
- Since the training program was initiated in June of 1989 over 200 people have been trained. The demand for additional training is increasing.
- DCDS has been proposed as the preferred Software Engineering Environment in both the USASDC and SDIO Software Policies.

- Purdue University, under contract to the Army Institute for Research in Management Information, Communication, and Computer Science, conducted an evaluation comparing DCDS to five commercially available CASE tools. DCDS outranked the best of the competition. Resulting conclusions stated that "DCDS is a very strong software engineering environment: very close to being an ideal tool for large projects".
- DCDS has been selected for use on programs both in and out of the SDC arena, including the Navy's Advanced Special Receiver, Army's Surface-to-Air Missile Operations Command, and the SDIO Level II System Simulator.

5.0 Important findings and conclusions

The experience of this contract points up four facts about the technology for computer-aided software engineering (CASE):

- Users want it. In the last year or two user awareness of the need for CASE systems has become widespread.
- Existing commercial CASE tools are not adequate to meet users' needs, especially in developing complex, distributed, real-time systems.
- CASE concepts (in contrast to implementations) are developing rapidly.
- Government agencies are duplicating efforts to build software engineering environments(SEEs)--DARPA's STARS program, NASA's SSE, the I-CASE project of the Standard Systems Center at Gunter Air Force Base. Some of these projects are taking a questionable approach: they are building a backplane to support many commercially available tools, with the expectation that multiple choices will provide full functionality. In fact, many deficient tools do not add up to a viable whole.

These facts call attention to possibilities for cost-saving new developments. By focussing support on an existing high-capability SEE, the Government could save money from multiple duplicative procurements and provide a tool that meets the needs of its users. Such a focussed support would save the large amounts of money spent by agencies on the development of new tools. It would also save the money spent by numerous projects to buy existing commercial tools.

The conclusion to be drawn from this situation is that the Government should support the development of a premier SEE, not by starting from scratch nor by stringing inadequate commercial tools together, but by enhancing the excellent SEE--DCDS--that it already owns.

6.0 Implications for further research

As stated previously, further research particularly in the areas of new hardware, advanced database techniques, and object-oriented methodologies must continue in order for DCDS to maintain its position as the SDC SEE--the only SEE in existence today.